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10/537,821	12/16/2005	Brian David Sowerby		7184

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EXAMINER	
MIDKIFF, ANASTASIA	
ART UNIT	**PAPER NUMBER**
2882	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	**Application No.** 10/537,821	**Applicant(s)** SOWERBY ET AL.
	Examiner Anastasia Midkiff	**Art Unit** 2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23 and 25-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23 and 25-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 December 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *06Oct2006 & 07Dec2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statements (IDS) submitted on 06 October 2006 and 07 December 2006 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 7, 13, 15, 17-22, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent to Bartle (US 5,479,023) in view of U.S. Patent to Gozani et al. (US 5,098,640).

With respect to Claim 1, Bartle teaches radiographic equipment comprising:

- a first source (within 6) of substantially mono-energetic fast neutrons (Column 6, Line 10) produced via the deuterium-tritium or deuterium-deuterium fusion reactions (Column 5 Lines 64-67), comprising a sealed-tube or similar generator for producing the neutrons (Column 5, Lines 3-5 and 62-67);

- a separate source (within 6) of gamma rays (Column 5, Lines 3-5) of sufficient energy to substantially penetrate an object to be imaged (Column 2, Lines 25-36);
- a shielding block comprised of source shielding (5) surrounding the neutron and gamma ray sources, apart from the provision of at least one opening for emitting radiation beams (Figures 2 and 7, Column 2 Lines 61-64, and Column 3 Lines 17-40);
- a detector array (5, Column 5, Lines 34-36) aligned with the fan-shaped beams emitted from the source shielding block (Figure 2) and shielded (5) to substantially prevent radiation other than directly transmitted from the sources reaching the array (Figure 2 and Column 5 Lines 31-43);
- said detector (5) being an array (20) of a number of scintillator pixels (Column 5, Lines 32-33), each associated with a photomultiplier tube (21, Column 5, Lines 34-41), to receive neutron radiation energy and gamma-ray radiation emitted from the sources (6) and to convert the received radiation into light pulses via photomultiplier tubes (Column 5, Lines 32-42);
- conversion means (21) for converting light pulses produced in the scintillators into electrical signals (Column 5, Lines 34-39);
- conveying means (15) for conveying the object between the sources and the detector array (Figure 2);

- computing means (25) for determining from the electrical signals the attenuation of the neutrons and the X-ray or gamma ray beams (Column 5, Lines 15-19) and to generate output representing the mass distribution and composition of the object interposed between the sources and detector array (Column 3, Lines 16-26); and,
- display means (30) for displaying images based on the mass distribution and the composition of the object being scanned (Column 3, Lines 1-3).

Bartle does not specifically teach that shielding block with at least one opening is a collimator with a slot for emitting substantially fan-shaped beams.

Gozani et al. teaches radiographic equipment for imaging an object with radiation from a fast neutron source (170) and an x-ray source (152), wherein a collimator (136) with a slot and shielding (172) are used to form substantially fan-shaped beams (Figures 5A and 5B) to ensure radiation of a desired volume of an object (134) inspected (Column 14, Lines 32-44).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the collimator of Gozani et al. in addition to the shielding block of Bartle, to provide a preferred fan-shaped beam of radiation for accurate volumetric imaging of an object inspected, as taught by Gozani et al. (Column 14, Lines 32-44).

With respect to Claim 2, Bartle further teaches the gamma ray source comprises a ^{137}Cs or ^{60}Co or similar radioisotope source having an energy of substantially 1 MeV (Column 2, Lines 62-64).

With respect to Claim 3, Bartle further teaches the gamma ray source comprises an electron accelerator producing X-rays through Bremsstrahlung on a target (Column 2, Lines 63-64).

With respect to Claim 4, Bartle further teaches that the neutron source produces neutrons having substantially higher energies than the gamma rays from the gamma ray source (Column 5, Lines 64-66), where the neutron and gamma sources are arranged to pass through the same opening in the shielding block (Figure 2), and a detector array (5) is used, comprising individual pixels of plastic or liquid organic scintillators (Column 5, Lines 34-38), where discrimination between the gamma rays and the neutrons is made on the basis of the energy they deposit in the scintillator (Column 2, Lines 57-61).

With respect to Claim 7, Bartle teaches most of the elements of the claimed invention, including minimizing scattered radiation by use of radiation shielding (5), but do not specifically teach that each opening of the source and detector shieldings are sufficiently wide to ensure full illumination of the detectors by the source.

Gozani et al. further teach each slot of the source and detector collimators (136, 182) are sufficiently wide to ensure full illumination of the detectors by the source, whilst minimizing the detection of scattered radiation (Column 13 Lines 48-68, and Abstract Lines 22-27).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the collimator slots of Gozani et al. in addition to the shielding block of Bartle, to provide a preferred fan-shaped beam of radiation for accurate volumetric imaging of an object inspected, as taught by Gozani et al. (Column 14, Lines 32-44).

With respect to Claim 13, Bartle et al. further teach that the electrical signals from detector scintillators and photomultiplier tubes are used to infer the transmission of the neutrons from the neutron source and the X-rays or gamma rays through the object being scanned, or the transmission of the neutrons from the first neutron source, the X-rays or gamma rays and neutrons from a second neutron source through the object being scanned (Column 5, Lines 1-42).

With respect to Claim 15, Bartle further teaches that the computing means (25) comprises a computer (Column 5, Line 15) to perform image processing and display the images on a computer screen (Column 5, Lines 15-20).

With respect to Claim 17, Bartle further teaches that the mass-attenuation coefficient images are obtainable from count rates (I_n and I_γ) measured from the transmissions for each of the deuterium-tritium neutrons or deuterium-deuterium neutrons and gamma rays (Column 3 Lines 17-26, and Column 4 Lines 1-22).

With respect to Claim 18, Bartle further teaches that the computer (25) is operable to obtain cross section ratio images between pairs of mass attenuation coefficient images (Column 3, Lines 17-26).

With respect to Claims 19 and 21, Gozani et al. further teach that the proportions in which the cross section images are combined are operator adjustable to maximize contrast and sensitivity to a particular object being examined in the image (Column 13, Lines 11-31, and Column 17 Lines 9-20).

It would have been obvious to use the operator adjustable contrast control of Gozani et al. in the computer of Bartle, to provide fine-tuning adjustment capability for

accurate identification of various types of contraband, as taught by Gozani et al. (Column 13, Lines 11-31).

With respect to Clam 20, Bartle further teaches that the computer (25) is able to perform automatic material identification based on the measured cross sections (Column 3 Lines 17-26 and 7-8, and Column 5 Lines 25-30).

With respect to Claim 22, Bartle further teaches that the sources and detector array are stationary (Figure 2 and Column 9 Lines 22-24) and a transport mechanism (15) is arranged such that the object is able to be moved in front of the source of neutrons (Figure 2 and Column 9 Lines 22-24).

With respect to Claim 26, Bartle further teaches the intensity of the deuterium-deuterium and/or deuterium-tritium neutron sources is as high as practically possible (Column 5, Lines 62-66).

Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gozani et al., as for Claim 1 above, and in view of U.S. Patent to Armistead (USP# 5,838,759).

With respect to Claim 5, Gozani teaches most of the elements of the claimed invention, including a collimating block (136) for the sources and a detector array (144, 146, 178-181), but does not teach that sources are arranged to pass through the same slot in the collimating block, that a single detector array is used, comprising individual pixels of plastic or liquid scintillator, wherein discrimination between the X-rays/gamma rays and neutrons is made on the basis of the energy they deposit in the scintillator.

Armistead teaches radiographic equipment for inspection of objects with x-rays and neutrons, with an x-ray source (14), a neutron source (12), and a single detector array (18) with liquid or plastic scintillator material (Column 6, Lines 3-20) for fast recovery of detector after x-ray flash (Column 3, Lines 45-49), wherein discrimination between the x-rays and neutrons slowed before striking detector is made on the basis of the energy they deposit in the scintillator (Column 5 Lines 60-67, and Column 6 Lines 1-20) with a reduction in parts and cost over separate detectors (Column 3, Lines 45-58), wherein the sources are combined by use of a converter plate (22) so that each will pass through the same slot in a collimator (16, Figure 1), providing a reduction in cost and parts over providing separate sources (Column 3, Lines 50-58).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the combined neutron and x-ray source, collimator, and detector of Armistead in the apparatus of Gozani et al. to provide a compact system with fewer parts and less expensive to make.

With respect to Claim 6, Gozani et al. further teach the sources are arranged to pass through separate parallel slots of the collimating block (Column 13, Lines 55-63), and two detector arrays are used, one for neutrons and one for x-rays, but do not teach that detector arrays comprise plastic or liquid scintillator pixels.

Armistead teaches radiographic equipment for inspection of objects with x-rays and neutrons, with an x-ray source (14), a neutron source (12), and a detector array (18) with liquid or plastic scintillator material (Column 6, Lines 3-20) for fast recovery of detector after x-ray flash (Column 3, Lines 45-49), wherein discrimination between the

x-rays and neutrons slowed before striking detector is made on the basis of the energy they deposit in the scintillator (Column 5 Lines 60-67, and Column 6 Lines 1-20).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the plastic/liquid scintillator of Armistead to provide quick detector recovery after use.

Claims 11, 13, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bartle and Gozani et al., as applied to Claim 1 above, and in view of U.S. Patent to Armistead (USP# 5,838,759).

With respect to Claim 11, Bartle and Gozani et al. teach most of the elements of the claimed invention including photomultiplier conversion means and scintillator material, but do not teach that the conversion means comprises a plurality of photodiodes, wherein the scintillator material is selectable to have an emission wavelength substantially matched to the response of the photodiodes

Armistead teaches radiographic equipment for inspection of objects with x-rays and neutrons, with an x-ray source (14), a neutron source (12), and a detector array (18) with liquid or plastic scintillator material (Column 6, Lines 3-20), with conversion means comprising a plurality of photodiodes with good operator range and detector-to-detector matching (Column 4, Lines 61-65), wherein the scintillator material is selectable to have an emission wavelength substantially matched to the response of the photodiodes (Column 4 Lines 45-67, and Column 6 Lines 3-20) to provide detectors that

are either inexpensive or with improved resolution for the type of radiation and application used (Column 6, Lines 3-20).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the scintillator material and photodiodes of Armistead in the apparatus of Bartle and Gozani et al. to provide detectors with better image quality and less background interference for the types of radiation incident upon them and the desired applications.

With respect to Claim 13, Bartle further teaches that the electrical signals from the conversion means (21) are used to infer the transmission of the neutrons from the neutron source and the gamma rays through the object being scanned (Column 5, Lines 1-20).

With respect to Claim 23, Bartle, as modified by Gozani et al., teaches most of the elements of the claimed invention, including the source and the detector array arranged on either side of the object (Figure 2) and a transport mechanism (15), but does not teach that the transport mechanism is arranged so that source and detector array move in synchronicity on either side of the object.

Armistead teaches radiographic equipment for inspection of objects with x-rays and neutrons, with an x-ray source (14), a neutron source (12), a detector array (18), and a transport mechanism (38) for an object (12) to be inspected, wherein the source, detector, and transport mechanism are arranged so that source and detector array move in synchronicity on either side of the object (Column 8, Lines 55-60) to inspect

large containers or vehicles that are difficult to move during inspection (Column 7 Lines 48-50, and Column 8 Lines 9-11).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the source and detector movement and transport arrangement of Armistead in the apparatus of Bartle, for the purpose of inspecting vehicles, or other large, heavy cargo.

Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bartle and Gozani et al., as applied to Claim 1 above, and in view of U.S. Patent to Givens (USP# 4,066,892).

With respect to Claims 8-10, Bartle, as modified by Gozani et al., teaches most of the claimed invention, including collimated detector arrays using plastic or liquid scintillator material (Column 5, Lines 34-38), and neutron sources using either the deuterium-deuterium or deuterium-tritium fusion reactions (Column 2 Lines 30-31, and Column 5 Lines 64-67), and a neutron source of substantially 2.45 MeV (Column 5, Lines 64-66).

Bartle and Gozani et al. do not teach a second neutron source producing neutrons, neutrons of an energy of substantially 14 MeV, and wherein the second source uses the complimentary fusion reaction to the first neutron source, and wherein neutrons from the second neutron source are detected in a separate detector array.

Givens teach radiographic imaging equipment for material identification wherein a first (11, 12) and a second source of neutrons of differing energy are used (Abstract,

and Figure 1), wherein the second source uses the complimentary fusion reaction to the first neutron source (Column 2, Lines 32-59), each with its own separate detector array (13, 14), to provide energy discrimination for selectively identifying specific elements or materials in objects inspected (Column 1 Lines 50-68, Column 2 Lines 1-10, and Column 3 Lines 35-37).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the second neutron source and detector of Givens in the apparatus of Bartle and Gozani et al., to provide the identity of materials identified in objects via energy discrimination.

Further with respect to Claim 10, although Givens teaches different energies for the sources, he does not specifically teach that the second source energy is substantially 14 MeV. Givens does teach that the selection of neutron energies is based upon the type of material to be identified (Column 3 Lines 27-37, and Column 4 Lines 10-18).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to set neutron energies at the optimum range for the material that is being looked for, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)*. Additionally, Examiner notes that applicant does not place any criticality on the values of 2.45 MeV and 14 MeV, using them as exemplary only in Lines 9-14 on Page 7 of the specification, and it appears that the invention would work equally well with other energies according to the chosen application of the system.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bartle and Gozani et al., as applied to Claim 1 above, and in view of U.S. Patent Application Publication to Katagiri (PGPUB# 2002/0121604).

With respect to Claim 12, Bartle and Gozani et al. teach most of the claimed invention, including conversion means and a multiplicity of single or multi-anode photomultiplier tubes (Bartle, Column 5 Lines 39-40), but does not teach that conversion means comprises crossed wavelength shifting fibers coupled to the photomultiplier tubes.

Katagiri teaches radiographic imaging equipment with a neutron/gamma ray detector array (Paragraph 47) having conversion means of crossed wavelength shifting fibers (Paragraphs 5 and 10) to enable multi-functional radiation imaging (Paragraph 10) in a detector that is easier and less expensive to make than mounting several small scintillators (Paragraph 5).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the wavelength shifting fibers of Katagiri in the apparatus of Bartle and Gozani et al., to enable multi-functional radiation imaging in a detector that is easy and inexpensive to produce.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bartle, Gozani et al., and Armistead, as applied to Claim 13 above, and in view of U.S. Patent to Walterman (USP# 6,061,469).

With respect to Claim 14, Bartle, Gozani et al., and Armistead teach most of the elements of the claimed invention, including using transmissions of radiation to compute mass attenuation coefficient images for each pixel, and an image based on these computations (Bartle, Column 3 Lines 1-26, and Column 4 Lines 7-22), but do not teach that different pixels values are mapped to different colors.

Walterman teaches imaging equipment wherein images obtained from radiation attenuated by an object are created with pixels mapped to different shades based on the mass attenuation of materials imaged (Flow Chart, Figure 3A) to allow fast visual identification of material in the image by the operator (Abstract).

It would have been obvious to one of ordinary skill in the art to use the shaded images of Walterman in the apparatus of Bartle and Armistead, to allow fast and easy identification of material by a human operator. Although Walterman teaches shades of black and white, it known to use colors to distinguish differences in images with the unaided human eye rather than shades of gray.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bartle, Gozani et al., and Armistead, as applied to Claim 1 above, and in view of U.S. Patent to Walterman (USP# 6,061,469).

With respect to Claim 16, Bartle, Gozani et al., and Armistead teach most of the elements of the claimed invention, including output that is convertible to mass-attenuation coefficient images for each pixel for display on a computer screen, but does not teach that different pixel values are mapped to different colors.

Walterman teaches imaging equipment wherein images obtained from radiation attenuated by an object are created with pixels mapped to different shades based on the mass attenuation of materials imaged (Flow Chart, Figure 3A) to allow fast visual identification of material in the image by the operator (Abstract).

It would have been obvious to one of ordinary skill in the art to use the shaded images of Walterman in the apparatus of Bartle, to allow fast and easy identification of material by a human operator. Although Walterman teaches shades of black and white, it known to use colors to distinguish differences in images with the unaided human eye rather than shades of gray.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bartle and Gozani et al., as applied to Claim 1 above, and in view of Armistead and U.S. Patent to Eberhard et al. (USP# 5,905,806).

With respect to Claim 25, Bartle and Gozani et al. teach most of the claimed invention, including obtaining multiple views, but does not teach that views are obtained by either rotating the object relative to the sources and the detector array or by rotating the sources and detector array relative to the object.

Armistead teaches radiographic equipment for inspection of objects with x-rays and neutrons, with an x-ray source (14), a neutron source (12), and a single detector array (18) with liquid or plastic scintillator material (Column 6, Lines 3-20) for fast recovery of detector after x-ray flash (Column 3, Lines 45-49), wherein discrimination between the x-rays and neutrons slowed before striking detector is made on the basis of

the energy they deposit in the scintillator (Column 5 Lines 60-67, and Column 6 Lines 1-20) with a reduction in parts and cost over separate detectors (Column 3, Lines 45-58), wherein the sources are combined by use of a converter plate (22) so that each will pass through the same slot in a collimator (16, Figure 1), providing a reduction in cost and parts over providing separate sources (Column 3, Lines 50-58).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the combined neutron and x-ray source, collimator, and detector of Armistead in the apparatus of Bartle and Gozani et al. to provide a compact system with fewer parts and less expensive to make.

Eberhard et al. teach radiographic imaging equipment wherein a source of X-ray radiation is used to image an object with a detector array (Column 2, Lines 61-62), wherein multiple views are obtained by rotating the source and detector array relative to the object using a gantry (100) so that bag content are not shifted (Column 3, Lines 28-33), to provide a three-dimensional density map of the object (Column 3, Lines 11-26) to determine if the object requires further screening by a neutron source (Column 2, Lines 61-65).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the gantry rotation of Eberhard et al. in the apparatus of Bartle, Gozani et al., and Armistead, to provide pre-screening of possible fragile, personal items in luggage without requiring possibly damaging object movement, and without the need for additional time and expense of neutron analysis of every package.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bartle and Gozani et al., as applied to Claim 1 above, and in view of U.S. Patent Application Publication to Homme et al. (PGPUB# 2003/0116715).

With respect to Claim 27, Bartle and Gozani et al. teach most of the claimed invention, including scintillators, but does not teach that scintillators are surrounded by a mask to cover at least a portion of each of the scintillators, each mask having a first reflective surface to reflect escaped light pulses back into the scintillator.

Homme et al. teach radiographic imaging equipment with a detector array (100) having scintillators (3), wherein scintillators are surrounded by a mask (52) to cover at least a portion of each of the scintillators (Figure 3), each mask having a first reflective surface to reflect escaped light pulses back into the scintillator (Paragraph 24) thereby increasing detection sensitivity (Paragraph 24).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the reflective mask of Homme et al. in the apparatus of Bartle and Gozani et al., to increase the sensitivity of the detector for improved imaging.

Response to Arguments

Applicant's arguments with respect to prior art rejections of claims 1-23 and 25-27 have been considered but are moot in view of the new ground(s) of rejection. However, two issues still remain with respect to Bartle.

With respect to Bartle, the Applicant asserts that Bartle does not teach mono-energetic neutron sources comprising a sealed tube or similar generator for producing the neutrons. The examiner respectfully disagrees.

As cited in the above action, Bartle uses a fast neutron source with a single energy, e.g. 2 MeV (Column 5, Lines 65-66), comprising either an Am-Be, 252-Cf or pulsed accelerator, or other types of radiation known to one skilled in the art (Column 5 Lines 62-64, and Column 2 Lines 62-64), wherein a pulsed accelerator type of source meets the limitation of a "sealed tube" generator. Additionally, the examiner notes that neutron sources of the type disclosed by Bartle would require a sealed tube.

Further with respect to Bartle, the Applicant asserts that Bartle does not teach that detector is an array with individual scintillator pixels. The examiner respectfully disagrees.

As cited in the above action, Bartle teaches a detector (5) wherein the detectors (20) comprise a number of scintillators (Column 5, Lines 34-36) that are individually coupled to photomultiplier tubes (Column 5, Lines 34-41) represented in at least a two-dimensional x-y pixel display area (Column 6, Lines 46-50).

Applicant's arguments, see Applicant amendment, filed 07 December 2006, with respect to objections to the drawings, specification, and claims have been fully considered and are persuasive. The objections to the drawings, specification, and claims have been overcome by the amendment.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anastasia Midkiff whose telephone number is 571-272-5053. The examiner can normally be reached on M-F 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ASM asm
3/2/07

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER